



## Attitudes to noise and behaviour towards hearing protection among Pasifika university students in New Zealand

Ravi Reddy, Vili Nosa, Ilaisaane Mafi & David Welch

To cite this article: Ravi Reddy, Vili Nosa, Ilaisaane Mafi & David Welch (2021) Attitudes to noise and behaviour towards hearing protection among Pasifika university students in New Zealand, Kōtuitui: New Zealand Journal of Social Sciences Online, 16:2, 324-334, DOI: [10.1080/1177083X.2020.1865418](https://doi.org/10.1080/1177083X.2020.1865418)

To link to this article: <https://doi.org/10.1080/1177083X.2020.1865418>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 17 Jan 2021.



[Submit your article to this journal](#)



Article views: 1983



[View related articles](#)



[View Crossmark data](#)



Citing articles: 1 [View citing articles](#)

RESEARCH ARTICLE



# Attitudes to noise and behaviour towards hearing protection among Pasifika university students in New Zealand

Ravi Reddy <sup>a</sup>, Vili Nosa <sup>b</sup>, Ilaisaane Mafi <sup>b</sup> and David Welch <sup>b</sup>

<sup>a</sup>School of Health Sciences, Massey University, Auckland, New Zealand; <sup>b</sup>School of Population Health, University of Auckland, Auckland, New Zealand

## ABSTRACT

It is estimated that 1.1 billion young people worldwide are at risk of hearing loss due to high levels of noise exposure. Hearing loss can contribute to low self-esteem, poor employment prospects and social problems. The aim of this research was to explore the attitudes and beliefs towards noise, hearing loss and hearing protection among Pasifika university students in New Zealand. 96 Pasifika students completed the Youth Attitude to Noise Scale (YANS) and Beliefs About Hearing Protection and Hearing Loss (BAHPHL) questionnaire electronically using a Qualtrics survey. The findings show that the study sample had similar low mean scores in the BAHPHL scales related to susceptibility to hearing loss, severity of hearing loss, and benefits of preventive action compared to findings of similar international research. This implies that Pasifika participants had more positive beliefs than their international peers on some factors. Despite their greater awareness, the Pasifika sample had poor attitudes related to minimising loud sounds in the daily environment, perceived barriers towards prevention, behavioural intention and social norms towards hearing conservation. This study provides a good foundation to develop a culturally appropriate hearing conservation intervention aimed at improving hearing-health outcomes among young Pasifika people.

## ARTICLE HISTORY

Received 23 September 2020  
Accepted 12 December 2020

## KEYWORDS

Hearing loss; young people; Pasifika; health promotion; behaviour change

## Introduction

Adolescents and young adults are often exposed to potentially damaging loud sounds during leisure activities. These sounds include continuous exposures such as listening to loud music through a personal listening device (PLD) and exposure to loud sounds from nightclubs, concerts, sporting events, and power tools; and impulse sounds such as firing guns and fireworks. Research has shown that the average sound level at concerts can be around 100 dBA (Ramakers et al. 2016), whereas the noise levels at clubs and bars are usually well above 90 dBA (Kelly et al. 2012; Welch and Fremaux 2017). Exposure to loud sounds can cause hearing problems such as temporary and permanent hearing loss,

**CONTACT** Ravi Reddy  [r.reddy@massey.ac.nz](mailto:r.reddy@massey.ac.nz)

This article was originally published with errors, which have now been corrected in the online version. Please see Correction (<http://dx.doi.org/10.1080/1177083X.2021.2013107>)

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group  
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

tinnitus and reduced ability to understand speech in noise (Le Prell et al. 2013; Jiang et al. 2016; Gopal et al. 2019). It is estimated that 1.1 billion young people worldwide could be at risk of hearing loss due to exposure to high levels of sound in their daily lives (Olusanya et al. 2014).

Noise-induced hearing loss (NIHL) due to exposure to loud sounds is a preventable disorder that has a devastating impact on people's lives, destroying social bonds, influencing mental health, and potentially impacting on physical health (Chia et al. 2007). It is also an invisible and often unrecognised loss that may be regarded as unimportant by individuals (Hunter 2018). This is likely to be due to a socio-cultural disregard for the seriousness of NIHL as a health issue accompanied by a fatalistic acceptance of hearing loss as inevitable due to social norms (Reddy et al. 2019). In order to combat these misconceptions, it is important to understand the factors that influence young people and their attitudes and behaviour towards noise exposure. There has been research carried out internationally (Zocoli et al. 2009; Gilles et al. 2012; Zhu et al. 2014; Balanay and Kearney 2015; Keppler, Dhooge, et al. 2015; Keppler, Ingeborg, et al. 2015; Degeest et al. 2018) but to date, there is a gap in evidence exploring young Pasifika people's attitudes and behaviour towards noise and hearing conservation. 'Pasifika' is a term used throughout this article when referring to people of Pacific Islands ethnicities (Ministry of Education).

The Pasifika community make up 8.1% of the total population in New Zealand and the median age in this demographic is 23.4 years (Statistics New Zealand 2018) making it the youngest ethnic group in New Zealand. As such, it is important to build an evidence-base related to noise and hearing conservation that helps inform the development of targeted interventions for this demographic. The aim of this research was to explore the attitudes towards noise, hearing loss and hearing conservation behaviour among Pasifika university students.

## Methods

### *Instrumentation and measures*

We administered the Youth Attitude to Noise Scale (YANS) and Beliefs About Hearing Protection and Hearing Loss (BAHPHL) questionnaire electronically using Qualtrics (Qualtrics, Provo, UT, USA). In addition to the YANS and BAHPHL items, the questionnaire included items to gather demographic information about the participants.

The YANS questionnaire was first developed in Sweden (Widen and Erlandsson 2004) and later translated into English and validated in the United States of America (Widen et al. 2006). The YANS contains 19 items which are categorised into 4 factors including attitudes toward noise associated with the elements of youth culture (8 items), the ability to concentrate in noisy environments (3 items), daily noises (4 items), and intent to influence the sound environment (4 items). The answers were coded on a five-degree Likert scale ranging from 'Strongly agree' to 'Strongly disagree'. The responses on the YANS Likert scale were coded from five to one, where a lower score indicated an attitude where noise is problematic and higher scores representing a negative or pro-noise attitude. Items 1, 3, 4, 7, 12, 13, 15, 18 and 19 were reverse coded (Widen et al. 2006). The YANS was divided into three categories based on the quartiles of the sum of the entire scale. The lower quartile (2.16–2.79) were individuals who could be characterised as having an 'anti-noise' or

positive attitudes. The sample in the middle quartiles (2.80–3.46) were characterised as having a ‘neutral’ attitude, whereas those in the upper quartile (3.47–4.32) had ‘pro-noise’ or negative attitude.

The BAHPHL questionnaire was originally a 31-item questionnaire developed by the United States of America National Institute for Occupational Safety and Health (NIOSH) in order to assess the beliefs concerning hearing loss impact and the attitudes towards hearing protection among workers (Svensson et al. 2004). We used a validated English version of the adapted Dutch 24-item questionnaire in which the items concerning occupational noise were omitted and the remaining items were adapted so the questionnaire was applicable to young adults (Degeest et al. 2018). This version had seven subscales which included susceptibility to hearing loss (6 items), the severity of the consequences of hearing loss (3 items), benefits of preventive actions (3 items), barriers to preventive action (4 items), behavioural intentions (3 items), social norms (2 items) and self-efficacy (3 items). Like the YANS, the same Likert scale and coding of the answers were used for the BAHPHL. Reverse coding was applied to items 1, 3, 4, 7, 8, 9, 11, 16, 17, 19 and 21. The lower the score (0.00–2.92) on the BAHPHL instrument, the more positive the belief towards hearing protection and hearing loss. The higher scores (3.42–4.58) reflected negative beliefs.

### ***Participants and recruitment***

The data were gathered from a convenience sample of Pasifika students currently enrolled at the University of Auckland (UoA) during the second half of 2018. The research was approved by the University of Auckland Human Participants Ethics Committee on the 14/10/2016 for 3 years, reference Number 016180. Potential participants were identified through various Pasifika Students’ Associations at the university. An advertisement for the study and an online link to the questionnaire was circulated to nine different Pasifika Students’ Associations (Cook Islands Students’ Association, Pacific Islands Students’ Associations, Commerce Association for Pacific and Maori, Auckland Pacific Health Initiative, Fijian Students’ Association, Tongan Students’ Association, Samoan Students’ Association, South Pacific Indigenous Engineering Students, and the Niuean Students’ Association) through email and social media (Facebook). The survey was sent to the leaders of these student groups who circulated it to their members through email and via their social media platforms (most groups have their own individual Facebook pages). Pasifika students were also recruited using the ‘snowballing’ method. Students who agreed to take part were encouraged to contact others to invite them to participate in the survey. Those participants were also asked/encouraged to recruit other participants (other Pasifika students at the University of Auckland) to complete the study.

An online version of the questionnaires was created as a Qualtrics survey and sent out to participants. Participation was voluntary and anonymous. Participants had the right to withdraw at any time up to the completion of the survey.

### ***Analysis procedure***

Descriptive parameters were established for items and factors related to the YANS and BAHPHL. The frequencies and percentages for categorical measures were summarised

while the means and standard deviations for continuous measures were determined. The data were compared with data from previous research (Gilles et al. 2012; Balanay and Kearney 2015; Keppler, Dhooge, et al. 2015; Keppler, Ingeborg, et al. 2015; Degeest et al. 2018) on the basis of plotted standard error bars (Cumming et al. 2007). The means and standard errors presented in the graphs were taken from the relevant publications (Balanay and Kearney 2015; Degeest et al. 2018; Gilles et al. 2012) except for the overall BAHPHL statistics from references (Keppler, Dhooge, et al. 2015) and (Keppler, Ingeborg, et al. 2015) which were obtained through personal communication with the lead author Hannah Keppler. ANCOVA was used to test for sex differences in YANS and BAHPHL scores while controlling for age. Statistical analysis was performed using the Statistical Package for the Social Sciences version 26.0 software (IBM Corp., New York, USA). An alpha level of 0.05 was adopted for all inferential statistical tests.

## Results

The mean age of the study participants was 23 years old. Most of the participants were female (82.3%), of Tongan ethnicity (32.3%) and born in NZ (65.6%) (Table 1).

The mean for the overall YANS score was 3.14 indicating a neutral attitude towards noise. Participants held positive attitudes towards influencing the sound environment while they reported negative attitudes towards daily noise. There were neutral attitudes related to the other two factors (Table 2).

The mean for the overall BAHPHL score was 2.77 indicating a positive belief towards hearing protection and hearing loss. The participants reported a positive belief towards susceptibility and severity of hearing loss and benefits of preventive action. However, the findings suggest negative beliefs towards barriers to preventive action, behavioural intentions and social norms (Table 3).

This study shows a neutral mean score for the entire YANS scale compared to positive mean scores for other studies. There was a neutral attitude towards noise associated with youth culture in this study while other studies reported negative attitudes (Figure 1).

This study shows a positive mean score for the entire BAHPHL scale which was similar to mean scores for other studies. Pasifika youth hold positive beliefs similar to other studies towards susceptibility and severity of hearing loss, and the benefits of

**Table 1.** Demographic information.

<b>Age</b>			<b>Gender</b>	
			Frequency	Percent
Range	19–44		Male	17
Mean	23.11		Female	79
Std. Deviation	4.54		Total	96
				100
<b>Ethnicity</b>			<b>Country of Birth</b>	
	Frequency	Per cent	Frequency	Per cent
Samoan	23	24	NZ	63
Cook Island Maori	8	8.3	Samoa	5
Tongan	31	32.3	Cook Is.	3
Niuean	5	5.2	Tonga	6
Fijian	7	7.3	Fiji	10
Other Pasifika*	22	22.9	Australia	2
Total	96	100	Other	7
			Total	96
				100

\* Another Pasifika ethnicity (e.g. Tuvaluan, Tokelauan, etc.)

**Table 2.** Overview of the scores on the entire YANS and the four factors.

YANS factors ( <i>N</i> = 96)	Mean	Std. deviation	Range
Attitudes towards noise associated with elements of youth culture (e.g. attending nightclubs)	3.28	0.73	1.38–4.75
Attitudes towards the ability to concentrate in noisy environments	3.01	0.89	1.00–5.00
Attitudes to daily noises (e.g. traffic noise)	3.67	0.70	2.25–5.00
Attitudes towards influencing the sound environment (e.g. at university)	2.44	0.57	1.25–4.00
Overall YANS score	3.14	0.51	1.95–4.32

preventing hearing loss. The mean scores for barriers to preventive action, behavioural intentions, and social norm factors suggest negative behavioural beliefs compared to neutral and positive beliefs in other studies (Figure 2).

There was no difference in this study between men (mean 3.12) and women (mean 3.15) on the YANS scale: ( $F(1,93) = 0.00, p = 0.988$ ).

Men scored higher than women on the Entire BAHPHL scale ( $F(1,94) = 9.110, p = 0.003$ ), and also differed on some of the subscales (Figure 3).

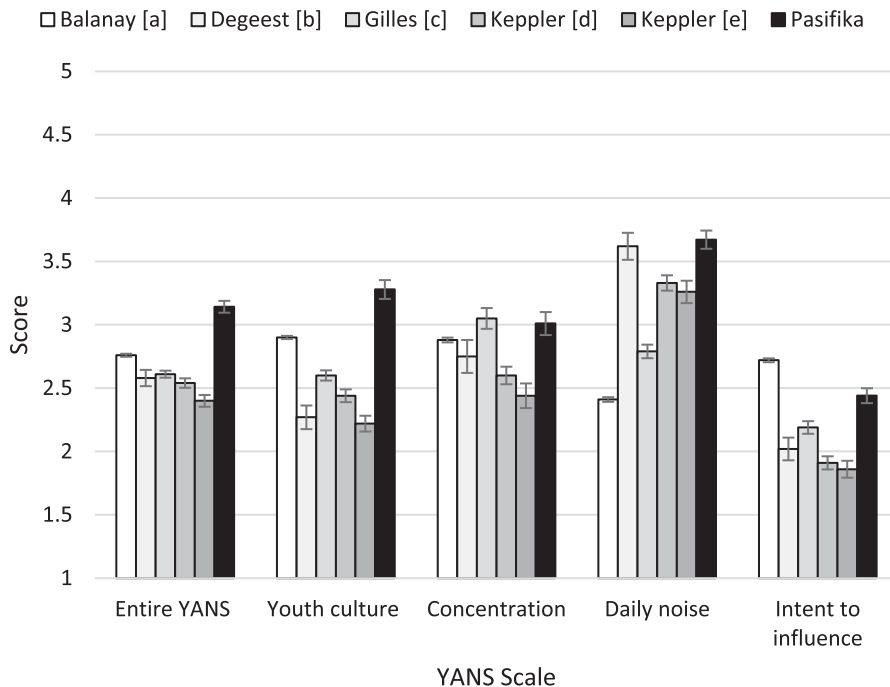
## Discussion

The key findings of this research imply that there are some differences between Pasifika youths and other youths sampled in similar international studies in relation to beliefs around hearing protection and hearing loss (Widen et al. 2006; Widen et al. 2009; Zocoli et al. 2009; Gilles et al. 2012; Balanay and Kearney 2015; Keppler, Dhooge, et al. 2015; Keppler, Ingeborg, et al. 2015; Degeest et al. 2018). In particular, the Pasifika sample had low mean scores similar to the European research in the BAHPHL scales: Susceptibility to hearing loss, Severity of hearing loss, and Benefits of preventive action, suggesting that the participants were more aware of the key issues, were concerned by daily noise, understood the risk and consequences of hearing loss and placed value on the benefits of prevention. On the other hand three factors had higher mean scores compared to those obtained in the European samples, suggesting that despite their greater awareness, the Pasifika sample had poor attitudes related to minimising loud sounds in the daily environment, perceived barriers towards prevention, behavioural intention and social norms towards hearing conservation.

It is also interesting to note that, in terms of the absolute scores on the scales the Pasifika participants did not feel strongly either way about recreational noise exposure prevalent among the youth lifestyle, though their attitudes were generally more pro-hearing conservation than the European samples. These sources of noise exposure

**Table 3.** Overview of the scores on the entire BAHPHL and the seven factors.

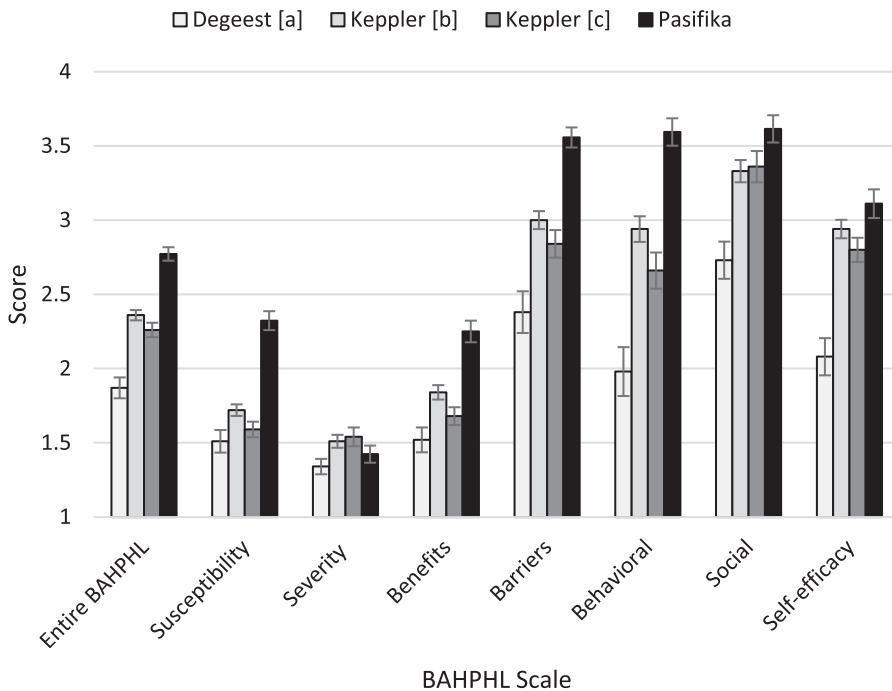
BAHPHL factors ( <i>N</i> = 96)	Mean	Std. deviation	Range
Susceptibility to hearing loss	2.32	0.63	1.00–3.50
Severity of the consequences of hearing loss	1.42	0.56	1.00–3.00
Benefits of preventive action	2.25	0.72	1.00–4.00
Barriers to preventive action	3.56	0.66	2.00–5.00
Behavioural intentions	3.59	0.91	1.00–5.00
Social norms	3.61	0.90	1.00–5.00
Self-efficacy	3.11	0.94	1.00–5.00
Entire BAHPHL	2.77	0.44	1.42–3.54



**Figure 1.** Comparison of YANS measures with other similar studies. Error bars represent one standard error of the mean. [a] Balanay and Kearney (2015); [b] Degeest et al. (2018); [c] Gilles et al. (2012); [d] Keppler, Dhooge, et al. (2015); [e] Keppler, Ingeborg, et al. (2015).

include discos, dances, rock concerts and sporting events, etc. These findings suggest that while Pasifika university students generally held positive attitudes towards exposure to noise and hearing loss, they were ambivalent about hearing conservation behaviour. While other studies have a negative attitude across the entire YANS survey, this study has a neutral attitude (Figure 1). The participants from this study appear to not have strong attitudes for or against noise which is unlike their pro-noise peers from other studies. The same pattern is seen when reporting youth culture. There was a neutral attitude that youth culture influences attitudes towards noise in this study, but other studies show youth culture as a strong factor influencing negative attitudes. It has been acknowledged that youth culture has a strong influence of noise exposure and hearing protection use (Crandell et al. 2004) but perhaps Pasifika youth are more conservative than their non-Pasifika peers. This is something that warrants further investigation.

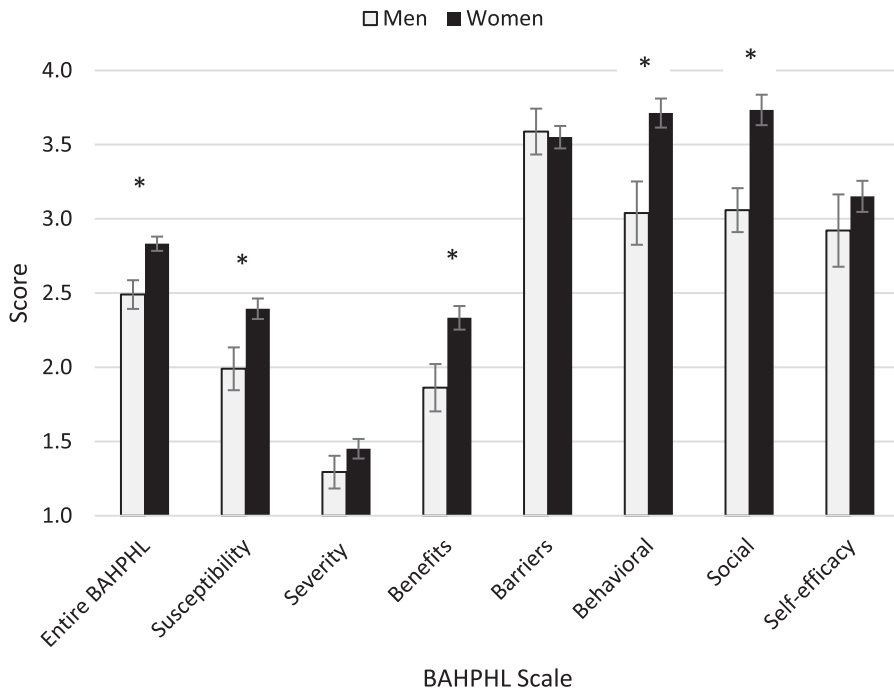
Furthermore, Pasifika youth are highly aware of the negative effects of noise, the severity of hearing loss, and the benefits of protecting hearing ability (Figure 2). By contrast, youth in the previous studies had similar awareness of these. Interestingly, Pasifika students' attitudes towards barriers, behaviour and the social aspect of hearing in protecting themselves from harm were negative and different from moderate to positive scores from previous research. This implies that young Pasifika people generally are better aware of the dangers of hearing loss but continue to engage in risky behaviour more than other groups (Gilliver et al. 2013). This may be linked to poor social attitudes and confidence to carry out this protection behaviour.



**Figure 2.** Comparison of BAHPHL measures with other similar studies. Error bars represent one standard error of the mean. [a] Degeest et al. (2018); [b] Keppler, Dhooge, et al. (2015); [c] Keppler, Ingeborg, et al. (2015).

Another explanation for the discrepancy between the knowledge about harm from noise and the behaviour could be that the habit of engaging in noisy leisure activities is considered a normal part in the lives of young people in our communities (Vogel et al. 2010; Welch and Fremaux 2017). There is evidence to suggest that people enjoy the physical sensation of feeling louds sounds through their bodies and that there are processes of adaptation, conditioning, and acculturation to loud music which perpetuate this (Hetu and Fortin 1995; Welch and Fremaux 2017). This suggests that the knowledge of risk and consequences related to hearing loss is overcome by a maladaptive response, which is to enjoy loud sounds. It may be that earlier interventions to instil deeper attitudes towards positive hearing-health may lead to behavioural changes in addition to the increased knowledge (Griest et al. 2007).

On this basis, there needs to be a more appropriate focus for hearing-health promotion programmes in the youth demographic. Existing programmes could be strengthened by developing strategies that bridge the gap that exists between 'knowing' and 'not engaging' in healthy practices and behaviour. One reason for this gap could be that young people incorrectly perceive that the use of hearing protection equipment (i.e. earplugs) will dull their listening experience (Hunter 2018). As such, hearing protection use among this demographic is unlikely to occur. The focus of hearing conservation needs to shift towards making hearing protection socially relevant. There is work in this space, where music listening platforms such as Apple and Google are using technology that integrates noise awareness in their products. This includes environmental and



**Figure 3.** Male and female scores on the BAHPHL. Error bars represent one standard error of the mean. \* significant difference  $p < 0.05$ .

phone noise alerts built into smartwatches and volume output limiters on listening devices. The music industry has strong relevance to younger people and as such these interventions may positively influence young people to behave in ways that will protect their hearing.

It has been reported that Pasifika communities do not talk about hearing loss as it may be viewed as a taboo subject (Reddy et al. 2019). This presents unique challenges on how to raise awareness in this community. There could be potential cultural sensitivities related to gender and health. The findings of this study showed males scoring higher on the overall BAHPHL score and other factors than females. This finding should be treated with caution as only about 20% of the sample comprised of males and as such may not be a true reflection of beliefs in this demographic. However, it is worth further exploration in future research. Our data have shown that young Pasifika are aware of the issues, so interventions may better be aimed at improving self-efficacy and overcoming maladaptive behaviours. As such, Pasifika values, worldview and perceptions must be considered when developing hearing conservation interventions that will influence these aspects for this demographic. One strategy would be to develop interventions with church leaders, elders and Chiefs. They are seen to positively influence social norms and health-related behaviour among Pasifika communities (Hopoi and Nosa 2020).

A limitation of this study is that these findings cannot be generalised to the larger Pasifika young adult population in New Zealand. This study was confined to a small cohort of the total Pasifika population and as such there may be differences in attitudes and behaviour in those who were not part of this study. As university students, our

sample may be better informed about the impacts of hearing loss than would the general population, consistent with the high scores on some BAHPHL scales when compared to the general population samples from Europe. Furthermore, as a study of university student attitudes, we included six participants who were studying while over thirty years of age, which might have influenced the comparability of our sample to those collected in Europe where participants were aged from 18 to 30 years. In case of this, we removed those participants and ran parallel analyses but no substantial differences in the results emerged, so we retained them in the presented data. Despite these limitations, the findings provide information related to this demographic that did not exist. This lays an evidence-based foundation for future research aimed at improving hearing-health outcomes for young Pasifika people.

## Conclusion

This is the first study to our knowledge that explores attitudes and behaviours towards noise and hearing protection among young Pasifika people. The findings suggest that attitudes to noise and perception towards hearing loss are generally positive. However, social norms, behavioural intention and barriers to protect hearing are negative. It is important for future research to explore these factors further to understand possible unique worldviews of young Pasifika people. This study provides a good foundation to develop a culturally appropriate hearing conservation intervention aimed at improving hearing-health outcomes among young Pasifika people.

## Acknowledgements

The authors would like to acknowledge the University of Auckland Summer Student Scholarship. IM was supported by this Scholarship. The authors thank Dr Hannah Keppler (Department of Speech, Language and Hearing Sciences, Ghent University, Ghent, Belgium) for kindly providing data from her research.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

This work was supported by the University of Auckland Summer Student Scholarship. I. M. was supported by this Scholarship.

## ORCID

Ravi Reddy  <http://orcid.org/0000-0003-0306-5902>

Vili Nosa  <http://orcid.org/0000-0002-7144-2805>

Ilaisaane Mafi  <http://orcid.org/0000-0001-7454-8405>

David Welch  <http://orcid.org/0000-0002-4055-2286>

## References

- Balanay JAG, Kearney GD. 2015. Attitudes toward noise, perceived hearing symptoms, and reported use of hearing protection among college students: influence of youth culture. *Noise & Health*. 17(79):394–405.
- Chia EM, Wang JJ, Rochtchina E, Cumming RR, Newall P, Mitchell P. 2007. Hearing impairment and health-related quality of life: The Blue Mountains Hearing Study. *Ear and Hearing*. 28(2):187–195.
- Crandell C, Mills TL, Gauthier R. 2004. Knowledge, behaviors, and attitudes about hearing loss and hearing protection among racial/ethnically diverse young adults. *Journal of the National Medical Association*. 96(2):176–186.
- Cumming G, Fidler F, Vaux DL. 2007. Error bars in experimental biology. *Journal of Cell Biology*. 177(1):7–11.
- Degeest S, Maes L, Leyssens L, Keppler H. 2018. The test-retest reliability of questionnaires regarding attitudes and beliefs toward noise, hearing loss, and hearing protector devices in young adults. *Noise & Health*. 20(93):31–36.
- Gilles A, De Ridder D, Van Hal G, Wouters K, Punte AK, Van de Heyning P. 2012. Prevalence of leisure noise-induced tinnitus and the attitude toward noise in university students. *Otology & Neurotology*. 33(6):899–906.
- Gilliver M, Beach EF, Williams W. 2013. Noise with attitude: influences on young people's decisions to protect their hearing. *International Journal of Audiology*. 52:S26–S32.
- Gopal KV, Mills LE, Phillips BS, Nandy R. 2019. Risk assessment of recreational noise-induced hearing loss from exposure through a personal audio system-iPod touch. *Journal of the American Academy of Audiology*. 30(7):619–633.
- Griest SE, Folmer RL, Martin WH. 2007. Effectiveness of “Dangerous Decibels,” a school-based hearing loss prevention program. *American Journal of Audiology*. 16(2):165–181.
- Hetu R, Fortin M. 1995. Potential risk of hearing damage associated with exposure to highly amplified music. *Journal of the American Academy of Audiology*. 6(5):378–386.
- Hopoi N, Nosa V. 2020. A qualitative study of the role of Samoan Church ministers in health literacy messages and health promotion in Auckland, New Zealand. *Australian and New Zealand Journal of Public Health*. 44:404–409.
- Hunter A. 2018. “There are more important things to worry about”: attitudes and behaviours towards leisure noise and use of hearing protection in young adults. *International Journal of Audiology*. 57(6):449–456.
- Jiang W, Zhao F, Guderley N, Manchiaiah V. 2016. Daily music exposure dose and hearing problems using personal listening devices in adolescents and young adults: a systematic review. *International Journal of Audiology*. 55(4):197–205.
- Kelly AC, Boyd SM, Henehan GTM, Chambers G. 2012. Occupational noise exposure of nightclub bar employees in Ireland. *Noise & Health*. 14(59):148–154.
- Keppler H, Dhooge I, Vinck B. 2015. Hearing in young adults. Part I: The effects of attitudes and beliefs toward noise, hearing loss, and hearing protector devices. *Noise & Health*. 17(78):237–244.
- Keppler H, Ingeborg D, Sofie D, Bart V. 2015. The effects of a hearing education program on recreational noise exposure, attitudes and beliefs toward noise, hearing loss, and hearing protector devices in young adults. *Noise & Health*. 17(78):253–262.
- Le Prell CG, Spankovich C, Lobarinas E, Griffiths SK. 2013. Extended high-frequency thresholds in college students: effects of music player use and other recreational noise. *Journal of the American Academy of Audiology*. 24(8):725–739.
- Ministry of Education. Pasifika in New Zealand. 2018. Wellington: New Zealand Government; [accessed 2018 Nov 24]. <http://pasifika.tki.org.nz/LEAP/Pasifika-in-New-Zealand>.
- Olusanya BO, Neumann KJ, Saunders JE. 2014. The global burden of disabling hearing impairment: a call to action. *Bulletin of the World Health Organization*. 92(5):367–373.
- Ramakers GGJ, Kraaijenga VJC, Cattani G, van Zanten GA, Grolman W. 2016. Effectiveness of earplugs in preventing recreational noise-induced hearing loss: a randomized clinical trial. *Jama Otolaryngology-Head & Neck Surgery*. 142(6):551–558.

- Reddy R, Welch D, Lima I, Thorne P, Nosa V. 2019. Identifying hearing care access barriers among older Pacific Island people in New Zealand: a qualitative study. *BMJ Open*. 9(8):e029007.
- Statistics New Zealand. 2018. 2018 Census population and dwelling counts. Wellington: New Zealand Government; [accessed]. <https://www.stats.govt.nz/information-releases/2018-census-population-and-dwelling-counts>.
- Svensson EB, Morata TC, Nylen P, Krieg EF, Johnson AC. 2004. Beliefs and attitudes among Swedish workers regarding the risk of hearing loss. *International Journal of Audiology*. 43(10):585–593.
- Vogel I, Brug J, Van der Ploeg CPB, Raat H. 2010. Discotheques and the risk of hearing loss among youth: risky listening behavior and its psychosocial correlates. *Health Education Research*. 25(5):737–747.
- Welch D, Fremaux G. 2017. Why do people like loud sound? A qualitative study. *International Journal of Environmental Research and Public Health*. 14(8):908.
- Widen SE, Erlandsson SI. 2004. Self-reported tinnitus and noise sensitivity among adolescents in Sweden. *Noise Health*. 7(25):29–40.
- Widen SE, Holmes AE, Erlandsson SI. 2006. Reported hearing protection use in young adults from Sweden and the USA: effects of attitude and gender. *International Journal of Audiology*. 45(5):273–280.
- Widen SE, Holmes AE, Johnson T, Bohlin M, Erlandsson SI. 2009. Hearing, use of hearing protection, and attitudes towards noise among young American adults. *International Journal of Audiology*. 48(8):537–545.
- Zhu XF, Bihi A, Hu XL, Lv YQ, Abbas A, Zhu X, Mo LY, Peng XX. 2014. Chinese-adapted youth attitude to noise scale: evaluation of validity and reliability. *Noise & Health*. 16(71):218–222.
- Zocoli AMF, Morata TC, Marques JM, Corteletti LJ. 2009. Brazilian young adults and noise: attitudes, habits, and audiological characteristics. *International Journal of Audiology*. 48(10):692–699.